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INFANT MORTALITY AND THE SIZE OF THE FAMILY.

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The influence of the birth rate on the rate of infant mortality has been frequently pointed out. Newsholme in his recent report to the English Local Government Board notes "the connection often observed between a high birth rate and a high rate of infant mortality."* Phelps, also, in his study of Infant Mortality and Its Relation to Women's Employment, states that in Massachusetts cities a "more direct relationship exists between infant mortality and the birth rate . . . than infant mortality and the employment of women," although in neither case, as his figures bring out, is the relationship invariable or even close.† The Director of the Statistical Service of France, on the other hand, has shown from an investigation made in 1907 by the Superior Council of Statistics that whatever relationship there may be between the birth rate and the infant mortality rate in cities or countries there is a very close relationship between the birth rate in families—or, what is practically the same, a close relationship between the size of the family and the rate of child mortality. It is not possible from the figures given in his study to separate the statistics for infants under one year of age, but by considering only the period from 1901–1907 it will be possible to secure a group with a maximum age at death of six years. This is done in the following table, which shows the mortality rate for infants whose fathers were employed in the public service of France according to their order of birth, or, in other words, according to the number of previous births in the family:

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*Great Britain, Local Government Board, Supplement to the Thirty-ninth Annual Report, p. 49.

†Phelps, Edward B., "Infant Mortality and Its Relation to Women's Employment—A Study of Massachusetts Statistics." In Volume XIII, Part 1, of the Bureau (Now Department) of Labor's Report on Condition of Women and Child Wage Earners in the United States, p. 38.

TABLE I.

MORTALITY RATE PER 1,000 BIRTHS AMONG CHILDREN WHOSE FATHERS WERE EMPLOYED IN THE PUBLIC SERVICE OF FRANCE CLASSIFIED ACCORDING TO ORDER OF BIRTH, 1901-1907. (a)

Order of Birth.	Number of Births.	Infant Mortality Rate.
First born	25,102	113.7
Second born	21,384	121.5
Third born	14,675	139.4
Fourth born	9,750	148.5
Fifth born	6,430	165.2
Sixth born	4,251	173.2
Seventh born	2,783	186.5
Eighth born	1,842	204.5
Ninth born	1,215	187.7
Tenth born	826	236.2
Eleventh born	455	248.4
Twelfth born and over	687	276.6
Total	89,400	138.3

(a) Compiled from Lucien March's "Some Researches Concerning the Factors of Mortality." Journal of the Royal Statistical Society, Vol. LXXV, Part 5, p. 519. (Cf. Appendix.)

This table shows a strikingly close relationship between child mortality and the order of birth, the rate having increased from 113.7 per 1,000 births among the first born children to 276.6 among those who were twelfth born or over.* As has just been stated the relationship shown in this table is between the order of birth and the rate of mortality for children under six years of age. The New York Free Outdoor Maternity Clinic has recently published data collected during the first nine years of its work which show the relationship between infant mortality and the number of children to which the mother has previously given birth—a classification for all practical purposes identical with that in Table I, based on the order of birth.

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*The only exception to the regular variation of the mortality rate with the order of birth was in the ninth group but this is not a serious exception, as it may be due to chance.

Dr. Alice Hamilton of Hull House, Chicago, in a recent article, "Excessive Child-bearing as a Factor in Infant Mortality" (Proceedings of the Conference on the Prevention of Infant Mortality, New Haven, 1909, pp. 74–80), shows a similar relationship between the order of birth, or size of the family, and the mortality rate for children under three years of age. Thus, among 1,600 infants born to mothers classified according to the number of children in their family the mortality rate per 1,000 births was as follows:

4 children or less	118
6 children or more	267
7 children or more	280
8 children or more	291
9 children or more	303

Among the Berlin working class Hamburger's investigation has also shown how serious a cause of infant mortality large families may be. (Kinderzahl und Kindersterblichkeit. Die Neue Generation, August, 1909). Quoted in Havelock Ellis' "The Task of Social Hygiene," pp. 150–1. Space does not permit the quoting of his figures in full.

TABLE II.

MORTALITY RATE PER 1,000 BIRTHS FOR INFANTS BORN TO MOTHERS COMING UNDER THE OBSERVATION OF THE NEW YORK FREE OUT-DOOR MATERNITY CLINIC, CLASSIFIED ACCORDING TO THE NUMBER OF PREVIOUS CHILDREN BORN TO MOTHER. (a)

Number of Previous Children Born to Mother.	Number of Births.	Infant Mortality Rate.
Less than 4	1,182	77
4 to 8	1,064	127
8 and over	294	170
0	97	10
1	288	66
2	369	81
3	428	96
4	355	127
5	354	189
6	203	163
7	152	105
8	135	207
9	90	166
10 and over	69	275
Total	2,540	124

(a) Compiled from the First Annual Report of the Free Out-door Maternity Clinic, Covering the First Nine Years of the Clinic's Existence, New York, 1910: Chapter 2, Part 2, Report of the Pediatric Department with a Study of Early Infant Mortality, by Herman Schwarz, M.D., pp. 42–3.

Table II shows a very close relationship between the number of children to which the mother has previously given birth and the rate of infant mortality during the year under consideration. Thus, the mortality rate rose from 77 deaths per 1,000 births for infants born to mothers who had previously given birth to less than four children to 170 for the infants whose mothers had given birth to eight or more.*

In the investigation by the Children's Bureau of infant mortality in Johnstown, Pa., the data gathered bearing on the relationship between fertility and the size of the family and infant mortality were classified according to the order of birth; but, as has already been shown, the terms "order of birth" and "number of the mother's previous pregnancies," though not absolutely identical, may be considered as practically so for our purpose.

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*The exceptions to the otherwise continuous relationship of these mortality rates with the number of children to which the mother had previously given birth which appear when, as in the lower part of the table, each group is considered separately, will be discussed in connection with a later table showing similar data gathered in the Boston investigation.

TABLE III.

MORTALITY RATE PER 1,000 BIRTHS FOR INFANTS INCLUDED IN THE JOHNSTOWN INVESTIGATION CLASSIFIED ACCORDING TO THE ORDER OF THEIR BIRTH. (a)

Order of Birth.	Number of Births.	Infant Mortality Rate.
First and second born	622	138.3
Third and fourth born	400	143.2
Fifth and sixth born	241	177.0
Seventh and eighth born	137	181.5
Ninth and later born	91	201.1
Total	1,491	149.9

(a) U. S. Children's Bureau: Infant Mortality—Results of a Field Study in Johnstown, Pa., Based on a Calendar Year, by Emma Duke. Washington, 1915, p. 51. Hereafter this report will be referred to by the briefer title—Infant Mortality: Johnstown, Pa.

Thus, in Johnstown a relationship appears to exist between fertility and the size of the family and the rate of infant mortality similar to that shown in previous tables for other investigations:*

It is obvious that in this relationship between infant mortality and the order of birth, or the number of previous children to which the mother has given birth, there are two distinct factors present—that of the size of the family in which the child lives after birth and that of fertility in its narrowest sense, including primarily the physical influence of childbearing upon the mother and upon the chances of survival of subsequent infants to which she gives birth. Better expressed, this relationship is brought about by the influence of both prenatal and postnatal conditions on infant mortality. With this in view an attempt was made in an investigation made in 1910 and 1911, by the Research Department of the Boston School for Social Workers, to take account of both of these factors and as far as possible to measure the influence of each.†

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*For other figures showing the relationship between infant mortality and the order of birth in the family see—R. J. Ewart, "The Aristocracy of Infancy and the Conditions of Birth," Eugenics Review, Vol. III, p. 166.

†The data collected in this investigation have not been before published. A brief description of the investigation would, therefore, be desirable if space permitted. Visits were made to the homes of 2,063 infants (stillborn infants not included) who were born in 1910 in Wards 6, 8, 13, and 17 of the city of Boston. The birth and death records were copied from the files of the Registry Department of the city and the visits to the homes made by fellows in the Research Department of the School for Social Workers during the academic years 1910–1911 and 1911–1912. During the second year of the investigation this field work was supervised by the writer under the general direction of Dr. T. W. Glocker, director of the Department of Research. The writer in using these data for publication wishes gratefully to acknowledge the interest and coöperation of the fellows who made the visits to the homes, as well as that of the director of the Department of Research. He is also indebted to Dr. J. R. Brackett, Director of the School for Social Workers, for permission to use the data in this way.

The method used was that of dividing the infant deaths into two groups, those reported as due to the diseases of early infancy and congenital malformation and those reported as due to all other causes—the former group being largely dominated by prenatal and the latter by postnatal influences—and showing the relation of the number of the mother's previous pregnancies to the infant mortality rate for each group. These figures are given in the following table, which shows the infant mortality rate per 1,000 births from all causes, from the diseases of early infancy and congenital malformation, and from all other causes for infants classified according to the number of their mother's previous pregnancies:*

TABLE IV.

MORTALITY RATE PER 1,000 BIRTHS FROM ALL CAUSES, FROM THE DISEASES OF EARLY INFANCY AND CONGENITAL MALFORMATION COMBINED, AND FROM ALL OTHER CAUSES FOR INFANTS BORN IN 1910 AND VISITED IN THE HOUSE-TO-HOUSE INVESTIGATION IN BOSTON, CLASSIFIED ACCORDING TO THE NUMBER OF THEIR MOTHER'S PREVIOUS PREGNANCIES.

Number of the Mother's Previous Pregnancies.	Number of Births.	Infant Mortality Rate per 1,000 Births from—		
		All Causes.	Diseases of Early Infancy and Congenital Malformations.	All Other Causes.
Less than 5	1,533	120.0	29.4	90.7
6 to 9	475	134.7	33.7	101.1
10 and over	53	226.4	75.5	228.6
0	371	91.6	24.3	67.4
1	390	100.0	25.6	74.4
2	309	139.2	35.6	103.6
3	265	150.9	41.5	109.4
4	198	141.4	20.2	121.2
5	177	175.1	45.2	129.9
6	118	110.1	16.9	93.2
7	84	107.1	11.9	95.2
8 and 9	96	114.6	52.1	62.5
10 and over	53	226.4	75.5	228.6
Total (a)	2,061	126.2	31.5	94.6

(a) Information was not obtained in two instances.

Table IV shows that the infant mortality rate varies in direct ratio with the number of the mother's previous pregnancies. Thus, among the infants born to the mothers with less than five previous pregnancies, 120 died in every 1,000 births, in comparison with 135 among those whose mothers had had from five to ten previous pregnancies, and 226 among those who had had ten or more.* The rate of mortality from the diseases of early infancy and congenital malformation combined and from all other causes varied in the same manner, thus showing that the influence of the number of the mother's previous pregnancies on infant mortality is both prenatal and postnatal.† There are, then, two distinct factors to consider in accounting for this relationship, first, the size of the family, and second, fertility and the effect of childbearing on the health and strength of the mother and her ability to bear strong and healthy children.

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*This classification of the mothers differs primarily from that used in the preceding table quoted from the report of the New York Free Out-door Maternity Clinic in that it is based on the number of the mother's previous pregnancies including stillbirths instead of upon the number of living births excluding stillbirths and, secondarily, in that, as previous pregnancies are dealt with, the one resulting in the birth of the infant under consideration is not counted. It was adopted largely because of the difficulty of distinguishing deaths soon after birth from stillbirths.

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*Closer examination of the lower part of the table where each pregnancy group is considered separately shows that the relationship is not entirely continuous. Thus, although the rate increases in almost continuous succession with the number of the mother's previous pregnancies up to the sixth group, it then begins to decrease and continues to do so until the group of mothers having eight and nine previous pregnancies is reached when it begins to rise again, until in the last group the highest rate of all appears. (The rate for the last group when subdivided was 171 for the infants born to those mothers having 10 or 11 previous pregnancies and 333.3 for those having 12 or more.) Practically the same condition is also seen to exist when the previous table compiled from the figures of the New York Free Out-door Maternity Clinic is examined in a similar manner.

Yet, these exceptions do not disprove, as might appear at first sight, the tendency shown when the pregnancy groups were combined. The drop in the mortality rate for the infants born to the mothers who had already had six or seven previous pregnancies is probably due to the fact that a large number of previous pregnancies not only decreases the chances of life of the infants born but, in the case of the weaker mothers, also tends to make childbearing impossible or else so perilous that it is voluntarily refrained from. It is, therefore, to be expected that the proportion of infant deaths to births will begin to decrease after the fourth and fifth pregnancy group when the weaker mothers begin to drop out of the ranks of the childbearing, thus leaving in these groups a larger proportion of strong and healthy mothers whose children will be relatively better fitted to survive.

That the low mortality rate for infants in the sixth and seventh group is due to the inclusion of a larger proportion of strong and healthy mothers in them is shown by an examination of the last two columns of the table where it will be seen that the drop in the rate from the diseases of early infancy and congenital malformations—diseases largely due to the condition of the mother during and before pregnancy—is greater than that from all other causes of death, these being largely the result of conditions arising after birth and not so directly connected with the intra-uterine period of the child's development. But even though from the standpoint of childbearing the physical condition of the mothers in the sixth and seventh groups may be so good that it renders their children relatively immune from the effects of continuous childbearing, in time, if they continue, their children will also be affected, as is shown by the renewed rise in the rate for the groups following the seventh.

These exceptions, therefore, cannot be regarded as vitiating the tendencies shown when the pregnancy groups are combined or as materially weakening the conclusion that the rate of infant mortality varies strikingly with the number of the mother's previous pregnancies and the number of children to which she has previously given birth.

†This follows from the fact—a fact that space does not permit us to submit detailed proof of—that the deaths of infants during the first week and month of life and to a lesser extent during the first three months are largely the result of conditions which affected the child's organism before birth and while it was developing in the mother's womb, or in other words largely the result of prenatal conditions, while the deaths of the later months of infancy are largely the result of conditions which affected the child after its birth, or in other words to the influence of postnatal conditions.

In accounting for this relationship between the size of the family and infant mortality several considerations should be borne in mind. It is to be expected, for instance, that congestion both as shown by the average number of persons per room and the number of persons sleeping in the bedroom with the infant will be greater among large than small families, and this was found to be true in the Boston inquiry.* Poverty, too, is generally agreed to be worse, other things being equal, where the number of small children in the family is large.† Moreover, those parents who bring into the world larger families than their neighbors deem themselves able to rear properly are frequently improvident, with a low standard of life, and in addition, are often characterized by a lack of intelligence or of sufficient knowledge of the simpler laws of hygiene. This is, of course, not true of the parents of all large families but of a sufficient number of them to raise the mortality rate for the class. In the Boston investigation it was found that of 341 mothers of whose character and intelligence the investigators felt competent to express an opinion,

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*PER CENT. OF INFANTS VISITED IN THE BOSTON INVESTIGATION, CLASSIFIED ACCORDING TO THE NUMBER OF THEIR MOTHERS' PREGNANCIES WHO LIVED IN HOUSEHOLDS WHERE THE AVERAGE NUMBER OF PERSONS PER ROOM WAS LESS THAN TWO, TWO, OR THREE OR MORE.

Number Mother's Pregnancies.	Less than Two.	Two.	Three or More.	Total.	
				Per Cent.	Number.
1	84.6	14.0	1.4	100.0	349
2, 3 or 4	59.5	35.1	5.4	100.0	908
5 or 6	34.2	44.9	20.9	100.0	350
7 or 8	18.7	61.0	20.3	100.0	192
9 or more	17.7	61.7	20.6	100.0	141
Total	52.3	37.6	10.1	100.0	1,940

†Bertillon in the following figures has shown this relationship of poverty to the size of the family in Paris (Nombre D'Enfants par Familles, Journ, de la Soc. de Statisque de Paris, April, 1901, p. 134. Quoted in Bailey's "Modern Social Conditions," p. 111), in the following table showing the number of children per 100 families in Paris, classified according to the economic resources of their parents (1896):

Very poor	156
Poor	144
Comfortable	131
Very comfortable	129
Rich	129
Very rich	127
Entire city	140

a somewhat larger proportion of the mothers of large families were rated as unsatisfactory in these respects than of those with small families.* The mothers of the larger families also ranked lowest when graded according to their knowledge, or rather their observance, of the laws of hygiene, this being especially evident when they were graded according to their standards of cleanliness and of ventilation.†

But all this leaves unanswered the question whether, other things being equal, the number of children in the family into which the infant is born has any direct postnatal influence upon the mortality rate. Doctor Newsholme, an eminent English authority, feels that it does not. He says, though he gives no data to sustain his opinion, that "large families evidently do not necessarily imply a tendency to high infant mortality. The connection often observed between a high birth rate and a high rate of infant mortality probably is due in great part to the fact that large families are common among the poorest classes, and these classes are specially exposed to the degrading influences producing excessive infant mortality."‡ This view, however, seems very onesided. While it is undoubtedly true, as has already been shown, that "the degrading influences producing excessive infant mortality" also tend to produce excessively large families—or else both the degrading conditions and the excessively large family are produced by the same deeper-lying causes—it is also just as true that an excessive number of children in the family in itself brings about conditions in the home that lower the infant's chances of survival. The term "large family" is, of course, relative. In some cases, where the parents have sufficient resources, interest, and leisure from other duties, what might otherwise be regarded as an excessively large family would under such circumstances be regarded only as normally large. On the other hand, it is difficult to understand how, in cases where the parents have not the resources, the interest, or the ability to provide for more than three children properly, the chances of survival of subsequent infants born into the family will not be lessened, other things being equal, by the birth of more than this number of children.

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*These figures were as follows:

Of 341 mothers of whom an opinion was given 81 were unfavorable; classifying these according to the number of the mother's pregnancies (including the one resulting in the birth of the infant under consideration) they were found to include:

8 per cent. of those who had had 1 pregnancy,
29 per cent. of those who had had 2, 3, or 4 pregnancies,
30 per cent. of those who had had 5 or more pregnancies.

†Thus, 781 out of 1,817 mothers from whom information was obtained said that they did not ventilate their bedrooms at all at night.

These included:

40 per cent. of those who had had 1 pregnancy,
44 per cent. of those who had had 2, 3, or 4 pregnancies,
46 per cent. of those who had had 5, 6, 7, or 8 pregnancies, and
32 per cent. of those who had had 9 or more pregnancies.

Thus, with one exception the per cent. of mothers who said that they did not ventilate their bedrooms at night increased with the number of the mother's pregnancies. This exception, which occurs with the mothers who had 9 or more pregnancies, may be due to chance, as the group included only forty cases.

Dr. Herman Schwarz in the First Annual Report of the Free Out-door Maternity Clinic (New York, 1910), p. 41, gives similar figures verifying the statement that the mothers of the larger families rank lower in general intelligence and in knowledge of hygiene than those of smaller families.

Thus, out of 679 mothers, 67 were graded as unsatisfactory in intelligence and 612 as satisfactory, the average number of children born per family being 3.8 among the former and 3.1 among the latter.

Of 670 mothers 491 were graded as having an unsatisfactory and 179 as having a satisfactory knowledge of infant hygiene, the average number of living births per family being 3.9 among the former and 3.5 among the latter.

‡Great Britain, Local Government Board, Supplement to the Thirty-ninth Annual Report, p. 49.

It is not difficult to understand how the popular misconception that the death rate in large families is low has arisen. The large families we meet so impress us with the number of children who are living that we forget the number who have died while, again, we never notice the small families that would have been large if so many of the children had not died during infancy and childhood. The writer has been unable to find any evidence whatever to support this popular belief that large families have low infant mortality rates, while there is abundance of evidence to show that the rate of infant mortality increases with the size of the family, and no small amount of evidence to show that the mortality rate for children and even adults is greater in large families than in small.*

The Influence of the Length of the Interval Between the Mother's Pregnancies.—As has already been intimated, the influence—both prenatal and postnatal—of fertility and the size of the family on infant mortality is partly determined by the length of the interval between the mother's pregnancies or deliveries.

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*See especially the article by March in the Journal of the Royal Statistical Society, Vol. LXXV, pp. 519 ff., previously quoted, and Dr. R. J. Ewart's two articles in the Eugenics Review on "The Aristocracy of Infancy and the Conditions of Birth," Vol. III, pp. 142–70, and "The Influence of Parental Age on Offspring," Vol. III, pp. 201–232. In the latter of these articles Doctor Ewart shows how the mean height of children is also affected adversely by the order of birth (p. 213).

Where this interval is large the influence of large families is less but where it is small it is much greater. The relation between the average interval between the pregnancies of the mothers visited in the Boston investigation and the rate of infant mortality is shown in the following table:

TABLE V.

MORTALITY RATE PER 1,000 BIRTHS FOR INFANTS BORN TO MOTHERS VISITED IN THE HOUSE-TO-HOUSE INVESTIGATION IN BOSTON, CLASSIFIED ACCORDING TO THE AVERAGE INTERVAL BETWEEN PREGNANCIES.

Average Interval between Mother's Pregnancies.	Number of Births.	Infant Mortality Rate.
1 year or less	159	138.4
1½ years	197	147.2
2 years	641	127.9
3 years	458	128.8
4 years	113	106.2
5 years and over	67	185.0
Total	1,635 (a)	132.1

(a) Information was not obtained in 57 instances. The 371 infants who were born during their mothers' first pregnancies are not included in this table.

Table V may at first sight seem to show no relationship between the average interval between the mother's pregnancies and the rate of infant mortality. Thus, although the rate decreases as the length of the interval increases until the period of five years and over is reached (from 143 where the average interval was less than two years to 128, 129 and 106 where it was two, three, and four years respectively) it then increases to 185 deaths per 1,000 births with the group of mothers the average interval between whose pregnancies was five years and over. Moreover, although the mortality rate for the first two groups combined (one year and less and one and one half years) is greater than that for the next three the rate for the first group proves to be higher than that for the second when they are separated (138 and 147 respectively). Yet, closer examination of the results shows that these apparent exceptions are not of sufficient importance to influence the conclusion.

In the former case, the rise in the mortality rate with the group where the interval between pregnancies was five years or over can be accounted for in two ways; first, on the supposition that the number of cases included in the group is too small (67) to allow any weight to be given it in drawing conclusions, or, second, on the supposition that such an exceptionally large interval between pregnancies as five years or more is, among families of the class for the most part visited in this investigation, generally the result, not of choice but of weakness or physical incapacity—a condition which would be likely to effect the strength and resistance of such children as might be born and thereby to raise the mortality rate for the class.

In the latter case, the fact that the rate for the group of infants born to mothers with an interval between pregnancies of one year or under is less than that for those where the interval was one and one half years does not disprove the existence of a relationship between the infant mortality rate and the length of the average interval between the mother's pregnancies because the rate for the first group where the average interval was less than one year would have been much higher if it were not composed so exclusively of mothers who had had few previous pregnancies and whose families were, therefore, small—a class which, as has already been shown, tends to have a very low infant death rate. In fact 70 per cent. of the mothers in this group had had only one previous pregnancy.

To fully appreciate the influence of this small interval between pregnancies the mothers in the group must be further classified according to the number of their previous pregnancies. When this is done it will be seen that the mortality rate for the infants born to mothers in the group who had had 1, 2, or 3 previous pregnancies was 129; for those who had had 4, 5, or 6 it was 333; while for those who had had over 6 previous pregnancies it reached the enormous proportion of 500 deaths per 1,000 births. A careful examination of the table, therefore, indicates, when account is taken of the number of the previous pregnancies and the size of the families of the mothers included in each group, that there is a striking relationship between the rate of infant mortality and the average interval between the mother's pregnancies.

Doctor Ewart in a recent article in the *Eugenics Review* emphasized this need for the "adequate spacing of births" by showing that the physical development of the children who survive is retarded by a short interval between births. Thus, as he shows in the following table, the average height and weight of over 800 children at the end of the sixth year of age was greater where the interval between births was large than where it was small:

TABLE VI.

RELATIONSHIP BETWEEN THE LENGTH OF THE INTERVAL BETWEEN BIRTHS AND THE MEAN HEIGHT AND WEIGHT AT THE END OF THE SIXTH YEAR OF AGE AMONG 866 CHILDREN OF MIDDLESBOROUGH, ENGLAND; 1911. (a)

Interval Between Births.	Mean Height in Inches.	Mean Weight in Pounds.
Less than 2 years	38.6	37.2
2 and under 2½ years	39.9	38.8
2½ to 3 years	40.3	39.1
3 years and over	41.7	39.4

(a) R. J. Ewart, M.D., "The Influence of Parental Age on Offspring," Eugenics Review, Vol. III, p. 211.

In commenting on this table Doctor Ewart says: "The female is used to the greatest extent that her fertility will allow; births at intervals of eleven months being quite common. . . . The birth interval is so short that the mother is unable to bring her whole vitality to bear. Thus one child, as it were, spoils the next." He then asks this very pertinent question: "Which is the most desirable, three children of a mean height of 39.5 inches or two of 41.0 inches, with all the other attributes of mankind altered in the same proportion? . . . As regards the individual there is no hesitancy as to the answer; but from the point of view of economic production it is quite possible that three inefficients may be better and do more work than the two efficients. Racial supremacy, however, is not a question of numbers, and concerns individual fitness only."

It must not be forgotten, moreover, that the mothers themselves do not escape without injury from the strain put upon them by too frequent childbearing; but this lowering of the vitality and strength of the mother as a result of an insufficiency of time between the two pregnancies for complete recovery from the strain of the first creates a condition which will be likely, other things being equal, to harmfully affect both the prenatal and postnatal development of subsequent children. In fact, both the mother and the children suffer when the length of the interval between births is too small. It is manifestly impossible for most mothers to properly nourish themselves, a new born baby, and a child within the uterus at the same time.

This point is especially important, for artificial feeding is more often resorted to by these mothers who are attempting to rear two babies at once—one within the womb and the other just born. Among the mothers visited in the Boston enquiry, for instance, 25 per cent. said that they had resorted to the use of bottle feeding because the quantity or the quality of their breast milk was reduced by a subsequent pregnancy. Among the Italian mothers this reason was given in over half the cases—a truly astounding proportion. Thus, when it is remembered that bottle feeding decreases the chances of survival of the baby from three to five times (as all authorities agree),* it can readily be understood how the coming of one child spoils the chances of survival of the previous one.

It is thus apparent that the influence of fertility and the size of the family, especially when combined with the influence of the length of the interval between pregnancies, constitutes an important factor in infant mortality. As Doctor Ewart says: "The wastage of life, and production of immature progeny with its consequent misery and suffering to the mother, can, to a much larger extent than is generally believed, be traced directly to the unfortunate fact that the fertility of women between their twenty-fifth and thirty-fifth years exceeds their power to reproduce healthy offspring." † However dangerous "race suicide" and the declining birth rate may be there can be little doubt that excessively large families is no remedy, and however desirable a high rate of births may be it is mere waste to bring children into the world faster than the laws of nature decree to be desirable.

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*See, for instance, the report of the investigation by the Children's Bureau of Infant Mortality; Johnstown, Pa., pp. 38–4, Davis' "Statistical Comparison of the Mortality of Breast-fed and Bottle-fed Babies" in the Am. Journ. of Diseases of Children, March, 1913, pp. 234–47, and the U. S. Bureau of Labor's Investigation of Infant Mortality in Fall River, Mass

†Prev. cit., p. 215.